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A HUNTER'S NOTES ON DOVES IN THE RIO GRANDE VALLEY

By ALDO LEOPOLD

SINCE 1917 I have kept a record of weights, food, plumage, habits, and percentage of squabs of about 400 Mourning Doves (*Zenaidura macroura*) killed during the hunting season in the central Rio Grande Valley near Albuquerque, New Mexico. The data has been plotted to show percentage of squabs killed at weekly intervals from August 16 to December 15, and also the average weight, old birds and squabs separately, for the same period. The data is as yet insufficient as a basis for smoothed curves, but it is sufficient basis for tabular expression as follows:

Date	Percentage of squabs	Weight old birds	Weight squabs
Aug. 16	10%
Aug. 23	15
Sept. 1	55	4.4 oz.	3.7 oz.
Sept. 8	60	4.3	3.6
Sept. 15	50	4.2	3.5
Sept. 23	50	4.2	3.4

The table shows first of all that there are few squabs abroad on the shooting grounds until September, and that therefore the old opening date of August 16 was too early. It shows that the present opening date of September 1 is biologically correct. The explanation of the rapid increase in squabs about September 1 appears to be as follows: The main crop of squabs stays near the nests in the cottonwood bosques and in the foothills, until well grown. The adults, however, make long flights to wheat stubble, where most of the August shooting used to be done. This August stubble shooting was wrong, because it killed mostly birds with dependent young.

The table shows secondly that after the main squab crop has issued forth, the young birds are just as numerous, or slightly more so, than the adults. *The yearly increase is therefore about 100%.* This conclusion is nearly inescapable, because there are no other factors that I know of which would prevent the proportion of squabs in the bag from pretty accurately reflecting the proportion of squabs in the whole dove population. The only possible sources of a differential proportion of squabs would be: (a) Selection in shooting. Nearly all these birds were killed in pass and jump shooting, and the young birds are practically as hard to hit and to kill as the old ones. (b) Wildness. The squabs may "lay" a little better than the old birds, but on the usual clear days in normal cover both lay good enough to prevent an abnormal percentage of squabs in the bag. (c) Distribution of young and old birds. The data covers a wide variety of sites, seasons, hours, feeds, etc., and there could be no differential from these sources. (d) Differential migration. The general accuracy of the conclusion above stated could be impaired only by assuming a differential migration of young as compared with old birds. There is some evidence to show that the grown squabs of the main crop go south before the late squabs and old birds (see decrease in average weight of squabs and percentage of squabs during September). However, to admit this as material to the question of yearly increase would raise rather than lower the estimated annual increase of 100%, and it seems nearly incredible that a bird which lays only two eggs could more than double its numbers each year. In fact, even the 100%

increase implies a high percentage of second broods and re-nestings. That second broods and re-nestings are common is strongly indicated by the evidence available. For instance, I found a dove brooding eggs near Tucson, Arizona, on September 1, 1916; I have also found numerous eggs and fledglings near Albuquerque in August. Many very small squabs are killed very late in the season.

The table shows that the weight of old birds decreases slightly after September 1. This is probably accounted for by food habits. As already stated, the old birds congregate on the wheat stubbles in August and there fatten rapidly. But these stubbles are generally plowed under about September 1, at which time the birds move to the doveweed patches along the foothills, mesas, and other sandy ground. The seed of the doveweed (*Psoralea*, sp.?), is preferred above all other food, except possibly wheat and beeweed (*Peritoma serulatum* and *P. breviflorum*). However, during backward years the doveweed seed is often not matured by September, and the birds must seek the hottest banks to find mature seed. In any event, feeding on doveweed requires more work and longer flights to water, which probably accounts for the loss in weight. During the winter the few birds that remain are found in wild sunflower patches, where they eat sunflower seed, or around old strawstacks, where they pick up waste wheat. During pinyon years doves are very fond of pinyon nuts. J. F. Mullen counted 60 nuts in one crop and H. B. Hammond counted 72 in another. Pinyon nuts occur only at three or four year intervals.

The decreasing average weight of squabs shown by the table is plainly due to the fact that as the birds grow scarcer in September, the hunter must seek his birds instead of waiting on a flyway, or flush-shooting a doveweed patch. In doing this he hunts groves and trees, thereby killing many small late squabs not yet big enough to migrate. Such few big squabs as are killed during the later part of the season weigh nearly as much as the old birds; in fact, by November, squabs are mostly indistinguishable from adults.

The dove has several habits, as a game bird, which I have never seen described in print. High, fast-flying birds, especially on a stormy day, may often be induced to pitch down and light by firing a shot at them. A dove merely winged will fall down and walk away, but will not seek cover like other wounded birds. A dove with body wounds will not even walk. A certain kind of wound (probably lungs) results in the bird flying away and alighting on the ground or in trees in nearly natural manner, but when found the bird is stone dead. This manner of death is much commoner with doves than with any other game bird I know of. Many hunters do not watch their "missed" birds carefully, and this accounts for the large number of dead doves found on the shooting grounds. Head shots tower spirally, with sudden collapse, like quail.

What are the doves' natural enemies? I do not think they have as many as quail, else they could not double yearly on two eggs, but I think hawks get quite a few. On November 23, 1919, near Tome Hill I saw a Sharp-shinned Hawk (*Accipiter velox*) catch an apparently healthy grown dove in a cornfield. I killed the hawk, and found the fresh blood and dove feathers on his claws, but could not find the dove. Two or three Marsh Hawks wheeling over a doveweed patch will sometimes flush many birds and cause them to flee to trees, but one Marsh Hawk does not worry them much. I never saw a Marsh Hawk actually pursue a healthy bird.

The dove is a temperamental bird. On certain days the doves do not feed,

but gather in trees and just sit around. On such days all birds show a decreased weight, doubtless directly due to empty crops. When scattered over the open mesas feeding on doveweed, a rainy day interferes with their feeding. They simply sit around under the lee side of bushes, keeping dry. Nevertheless they make their regular evening flight to water although it would seem easy to gather the necessary water off the stems and leaves of plants. On such days the birds killed on the flyways to water show decreased weight due to empty crops.

The daily flight to water generally starts between 3:00 P. M. and 4:00 P. M. and reaches its height just before dark. Sometimes, where long distances must be traversed, the birds do not arrive at water until after dark. When the wind parallels the water flight, the flight going and coming will be at different levels; for instance with the wind blowing toward water, the birds going to water will fly high and with tremendous speed, while the birds beating their way back against the wind will fly so low as to be nearly hidden by ordinary sage-brush. Some hunters take advantage of this and shoot only the easy birds beating into the wind.

The dove's choice of watering places is peculiar. In the hills they like springs, stock tanks, and open sandy creeks. On the Rio Grande bottoms they use waste irrigation water spilled along open roads, grassy vegas provided the cover is short, and ponds with bare shores. It is generally supposed that they seek freedom from cover which might harbor natural enemies, but if this is the main factor governing their choice of watering places, then the shallow rills on the big open sandbars of the Rio Grande ought to suit them exactly. But I have never seen a dove light on a river sandbar. Here is an interesting problem to solve.

Many doves are killed yearly in New Mexico but no decrease in numbers is noticeable. The area adapted to doves is so enormous that the total population is probably very little affected by localized shooting.

Albuquerque, New Mexico, October 13, 1920.

CONCERNING THE STATUS OF THE SUPPOSED TWO RACES OF THE LONG-BILLED CURLEW

By JOSEPH GRINNELL

(Contribution from the Museum of Vertebrate Zoology of the University of California)

IN THE FALL of 1918 vertebrate collecting was carried on by a party from the California Museum of Vertebrate Zoology at Morro, San Luis Obispo County, California. Among the birds of interest obtained there was the series of Long-billed Curlew listed in the table presented farther along in this paper. The acquisition of so many specimens (fifteen) of this Curlew, taken from one locality and within a period of less than one month in a single year, seemed to afford ground for looking into the standing of the recently proposed two races of the species, namely *Numenius americanus americanus* Bechstein and *Numenius americanus occidentalis* Woodhouse. This separation was first pro-